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Indications for and techniques of red cell transfusion

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Contents

Basic rule

- Clinically significant (symptomatic) acute or chronic anaemia should be corrected by transfusion if there is no specific treatable cause or if the clinical condition requires rapid correction of the anaemia.

Indications for red cell transfusion

- Red cell transfusion can be performed in primary care in the following cases:
    - **After acute bleeding (e.g. epistaxis or wound) if the blood loss is between 20 and 40% of total blood volume.**
        - Physiological saline can always be used as first aid in acute anaemia.
        - The general condition of the patient and underlying diseases should always be taken into account when deciding on the need for red cell transfusion. The haematocrit is just one of the criteria. In patients with ischaemic heart disease even a small decrease in the haematocrit may increase the risk of myocardial infarction.
        - If the patient has lost more than 50% of his/her blood volume, plasma constituents must be administered in addition to volume correction and red cell transfusion. Refer the patient to a specialized hospital.
        - If bleeding continues (in the gastrointestinal tract) the patient should be referred to a hospital where transfusions can be performed and the bleeding stopped endoscopically (See related EBM Guideline: **Melena** available on the EBM Web site).

        - Peroral iron substitution (100 mg Fe^{++} x 2) should be started at once and continued for at least 2 months.
    - **Chronic therapy-resistant (normovolaemic) anaemia** (See related EBM Guideline: **Secondary anaemia** available on the EBM Web site)
        - The main target is to maintain the patient´s usual physical exercise capacity.
        - Transfusions are not routinely recommended for patients with malignant disease or severe systemic disease unless the transfusions can be expected to improve the patient´s condition or independence.
        - The transfusion threshold must be individually determined for each patient. Most patients have annoying symptoms of anaemia if the haemoglobin concentration is below 70 g/L. Transfusion of 2 - 4 units of red cells is usually performed. If the patient has cardiac or pulmonary symptoms the threshold haemoglobin value (determined by the symptoms) is higher. In some patients the haemoglobin concentration must be kept above 120 g/L, with the drawback that spontaneous red cell production may decrease and the interval between transfusion may be shortened.

Selection of the red cell concentrate in special cases

- **Red cell concentrate without leucocytes**: correction of anaemia in patients who must avoid HLA immunisation or cytomegalovirus infection.
    - Aplastic anaemia or leukaemia
    - Before and after organ transplantation
    - Patients with suspected haematological disease
    - Paroxysmal nocturnal haemoglobinuria (PNH)
    - Pregnancy
    - Patients who have had a febrile reaction from leucocytes in a red cell concentrate (Level of Evidence = B; Evidence Summary availalbe on the EBM Web site)
- PNH; washed red cells (complement has been removed)
- Deficiency of IgA; washed red cells (IgA has been removed)
- Deficiency of IgA and anti-IgA antibodies; red cells from a donor with IgA deficiency or five times washed red cells
- Immunodeficiency associated, with for example, cytostatic drugs or immunosuppression; irradiated red cells (to prevent graft versus host reaction)
- Typed red cells if the patient has clinically significant antibodies
- The red cell unit should be warmed (+37°) before transfusion if the patient has cold agglutinins.

Techniques of red cell transfusion

1. **Take a blood sample for blood group and compatibility test**
    - Check the identity of the patient.
    - With the exception of emergencies, blood samples for blood group determination and compatibility tests should be taken at different times by different persons.
    - The samples should be stored in a refrigerator as whole blood. They remain analyzable for five days.
2. **Check the blood unit**
    - The blood group on the bag label corresponds to the blood group recorded in the patient´s notes (see below).
    - Red cells from donors with other than identical (but compatible) blood groups can be

used much more freely than whole blood products (See related EBM Guideline: **Erythrocytosis** available on the EBM Web site). The rules on acceptable incompatibility should be clear in advance.
    - Check the compatibility test: the numbers on the bag and on the tube should match (the compatibility test has been performed using the correct unit) and the compatibility test should have been recorded as performed.
3. Check the patient´s **identity**.
4. Check vital functions (**blood pressure, pulse, temperature**) before the transfusion.
5. **Infusion**
    - The infusion needle should be sufficiently thick (e.g. a yellow Viggo© needle).
    - One unit (about 320 mL) is infused over 1 - 2 hours in a normovolaemic patient. Two units can be infused one after another; thereafter a break of a few hours is recommended, at least in elderly patients.
    - If the patient has heart failure and oedema or pulmonary congestion 20 mg of furosemide should be administered intravenously during the transfusion of each unit.
    - Monitor the patient carefully, particularly during the first 15 minutes of the transfusion. For actions to be taken if a transfusion reaction occurs see article (See related EBM Guideline: **Transfusion reactions** available on the EBM Web site).

Related evidence

- There is no evidence that albumin administration would be beneficial for critically ill patients (hypovolaemia, burns, hypoalbuminaemia) and it may increase the risk of death (Level of Evidence = B; Evidence Summary available on the EBM Web site).
- The risk of post-operative infections is increased two-fold if allogeneic blood is transfused rather than autologous blood (Level of Evidence = C; Evidence Summary available on the EBM Web site).

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